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NARROW-BAND SONAR SIGNALS OF SMALL CETACEANS

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ABSTRACT

The sonar signals of some of the smallest cetaceans are very similar to each other and very different than that of mid-sized cetaceans. Signals of *Cephalorhynchus hectori*, *Cephalorhynchus commersonii*, (genus *Cephalorhynchus*), *Phocoena phocoena*, *Neophocoena phocoena* and *Phocoenoides dalli* (family phocoenidae) are compared with those of some larger dolphins. Signals of *Tursiops truncatus*, *Delphinapterus leucas* and *Pseudorca crassidens*, housed in Kaneohe Bay, Oahu, Hawaii, have peak frequencies between 100-120 kHz, with high amplitudes (210-225 dB re 1 μ Pa), short durations (50-70 μ s), and wide bandwidths (30-40 kHz). Some of the smaller cetaceans emit signals having peak frequencies between 120 and 140 kHz, with low amplitudes (< 170 dB re 1 μ Pa), long durations (170-430 μ s) and narrow bandwidths (7-11 kHz). Double pulses are also emitted regularly by some of the smaller dolphins and very infrequently by the larger dolphins. Signals used by the smaller animals may reflect constraints associated with their small size and differences in generation mechanisms. For a given peak acoustic pressure, there is 3 to 4 times more energy in the signals of the smaller cetaceans. However, because of the narrower bandwidths, the distance resolution capability of the small cetacean signals is between 2 to 3.5 times inferior to that of the larger animals. Furthermore, the narrow bandwidth signals do not possess any doppler resolution properties.